

# Getting Back on Track

## Course Progression for Students Who Fail Algebra I in Ninth Grade

RESEARCH BRIEF 6



June 2017

**THE BACK ON TRACK STUDY** is an investigation about credit recovery in Algebra I for students who fail the course in ninth grade. Students who fail Algebra I are required to recover the credit during high school to earn a diploma, and online credit recovery courses have become a popular strategy in schools and districts around the country. The *Back on Track Study* examines the impact of an online credit recovery Algebra I course compared with a standard face-to-face version of the course; both courses were offered the summer after ninth graders failed Algebra I. The study was funded by the U.S. Department of Education's Institute of Education Sciences, and it was conducted by American Institutes for Research and the University of Chicago Consortium on School Research, in partnership with Chicago Public Schools (CPS). This study is a randomized controlled trial that was designed to address two types of questions:

- 1. What is the impact of online versus face-to-face Algebra I courses for credit recovery?**
- 2. What is the long-term effect of offering expanded credit recovery options early in high school?**

The study took place in 17 CPS high schools that offered both online and face-to-face Algebra I credit recovery courses in summer 2011 and summer 2012. A total of 1,224 ninth graders participated in the study by enrolling in a second-semester Algebra I course for credit recovery during the summer after failing the class. Students were randomly assigned to take the online or face-to-face course.

This research brief is one in a series for the *Back on Track Study* that presents the findings regarding the relative impact of online versus face-to-face Algebra I credit recovery on students' academic outcomes, aspects of implementation of the credit recovery courses, and the effects over time of expanding credit recovery options for at-risk students.

## RESEARCH BRIEFS IN THIS SERIES

*Getting Back on Track: Comparing the Effects of Online and Face-to-Face Credit Recovery in Algebra I*

*Getting Back on Track: The Role of In-Person Instructional Support for Students Taking Online Credit Recovery*

*Getting Back on Track: Who Needs to Recover Algebra Credit After Ninth Grade?*

*Getting Back on Track: What Math Content Is Taught and Learned in Online and Face-to-Face Algebra Credit Recovery Courses?*

*Getting Back on Track: The Effect of Online Versus Face-to-Face Credit Recovery in Algebra I on High School Credit Accumulation and Graduation*

*Getting Back on Track: Course Progression for Students Who Fail Algebra I in Ninth Grade*

Please visit [www.air.org/CreditRecovery](http://www.air.org/CreditRecovery) to access all of the research briefs and for more information about the *Back on Track Study*.

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Algebra I is an important gateway course for higher level mathematics and science, and it is required for graduation in many school districts across the country. Yet many students struggle to successfully complete Algebra I. Pass rates are consistently low in many places, particularly in urban school districts.<sup>i,ii</sup> Research has shown that students who fail core courses in their first year of high school are significantly less likely to graduate on time than students who pass<sup>iii</sup>—and this pattern is particularly striking when students fail Algebra I. To get back on track for high school success and graduation, students must retake Algebra I to recover the credit. But to better understand the implications of failing Algebra I, we need to better understand the extent to which course failure disrupts progress to graduation.

The *Back on Track Study*, conducted by American Institutes for Research and the University of Chicago Consortium on School Research, was designed to examine whether students who took an online Algebra I credit recovery course over the summer had different educational outcomes at the end of the course than students who took a face-to-face Algebra I credit recovery course. The study also investigated whether early credit recovery helps at-risk students who fail Algebra I in Grade 9 get back on track for high school graduation.<sup>1</sup>

This brief examines the course progression of students in Chicago Public Schools (CPS) who failed Algebra I during their first year of high school. The purpose is to help determine the importance of Algebra I failure and recovery for student success in subsequent courses. Specifically, this brief describes math course credit accumulation and on-time graduation for four types of Algebra I completion:

- *Passed Algebra I in ninth grade*: passed both semesters of Algebra I during the first year of high school
- *Early credit recovery*: failed Algebra I in ninth grade (at least one semester) and recovered credit by the end of 10th grade
- *Late credit recovery*: failed Algebra I in ninth grade (at least one semester) and recovered credit after 10th grade
- *Never passed Algebra I*: failed Algebra I in ninth grade (at least one semester) and did not recover the credit by the end of 12th grade

### **Course Progression for Students Who Fail Algebra I in Ninth Grade—KEY FINDINGS**

- Less than half of the students (43%) who failed Algebra I in ninth grade recovered the course credit by their fourth year of high school.
- Almost two-thirds of students (65%) who recovered Algebra I credit had enough math course credits to graduate by the end of 12th grade.
- Almost two-thirds of students (62%) who recovered Algebra I credit graduated within 4 years.

<sup>1</sup> The study was funded with research grant R305A110149 from the U.S. Department of Education's Institute of Education Sciences. The opinions expressed are those of the authors and do not represent the views of the Institute or the U.S. Department of Education.

## About the Study

Typically, CPS students who fail one or both semesters of Algebra I enroll in the next mathematics course in the sequence (Geometry or Algebra II) in their second year of high school, but to earn a diploma they must eventually recover the Algebra I credit during high school. One option is for students to attend summer school. However, the rate of recovery the summer after failing the course typically is low. For example, during the year before the study started (2009–10), only 13% of CPS freshmen who failed their spring semester of Algebra I recovered the course credit over the summer. This study was conducted in partnership with the district to investigate whether offering online credit recovery was more effective at promoting credit recovery than traditional face-to-face summer classes, the summer after failing Algebra I in Grade 9.<sup>iv</sup>

In this brief, we describe the math course progression for students who failed Algebra I in ninth grade to better understand how the path toward graduation differs for students who failed and recovered Algebra I credit, relative to students who passed Algebra I in ninth grade, and those who failed and did not recover credit. The results presented in this brief draw on CPS administrative records for 36,423 students who were first-time ninth graders at a regular CPS high school (96 schools) during the 2010–11 or 2011–12 school year, and who were enrolled in an Algebra I course in both the fall and spring semesters of their freshman year.

The analysis of math course progression was based on 31,572 of the 36,423 students (87%), because we excluded students who transferred to a non-CPS school during their first 4 years of high school.<sup>2</sup> The analysis of on-time graduation (graduating by the end of a student's fourth year) was based on 31,680 of the 36,423 students (87%), because we excluded students who transferred to a non-CPS school and did not return to a CPS school by the end of their fourth year (when graduation status was determined).<sup>3</sup>

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<sup>2</sup> Because students who transferred to a non-CPS school (charter school or outside the district) during high school had incomplete course records in the district data, we analyzed math course credits only for students who were enrolled in a CPS school for all 4 years or who no longer were enrolled in a school. Students who no longer were enrolled in a CPS school and had no record of transferring to a non-CPS school (e.g., dropouts) were included in the analysis, with their math credits based on the number of credits they had earned prior to leaving school.

<sup>3</sup> The analysis of on-time graduation includes more students than the analysis of cumulative math course credits because the analysis of course credits excludes students with any transfer out of CPS during their first 4 years of high school, regardless of whether those students returned to a CPS school. The analysis of graduation excludes students only if they transferred out of CPS during their first 4 years of high school and remained out of the district.

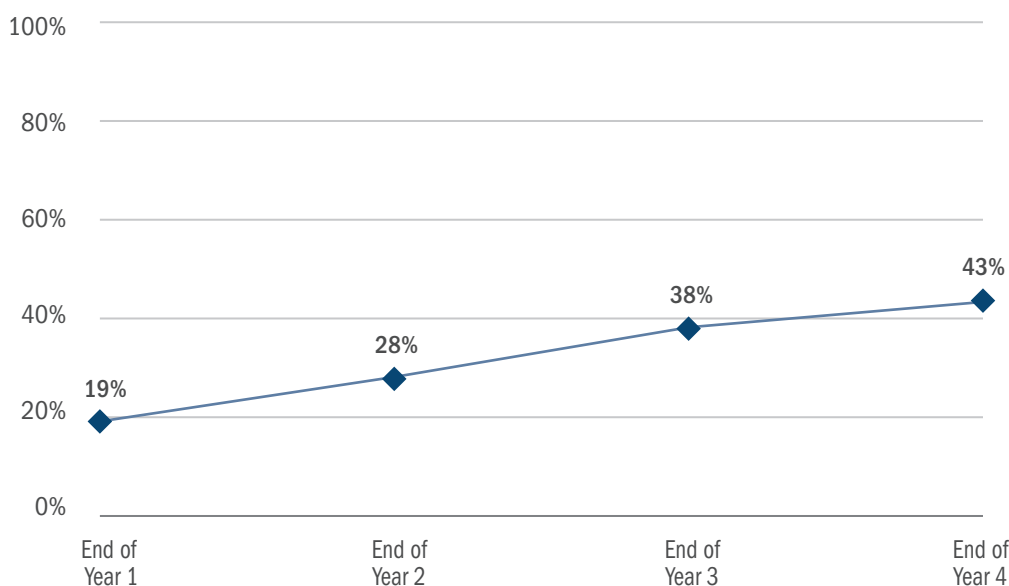
## Study Findings

### Less than half of the students who failed Algebra I in ninth grade recovered the course credit by their fourth year of high school

Among the students who took Algebra I in ninth grade and were included in the analysis of math course progression, 82% passed both semesters in their ninth grade year and 18% did not.<sup>4</sup> Students who did not pass both semesters of Algebra I could recover the credit over the summer or during a subsequent school year. Figure 1 shows the percentage of students who passed Algebra I (both semesters) among the students who did not pass in their ninth grade year. By the end of a student's first year of high school, including the summer between ninth and 10th grade, 19% of the students who needed to recover credit did pass both semesters of Algebra I.<sup>5</sup> By the end of a student's fourth year, only 43% of the students who needed to recover credit had done so.

Overall, 82% of the ninth-grade students passed Algebra I in their ninth-grade year, 5% recovered the Algebra I credit early in their high school career (by the end of their second year), 3% recovered the Algebra I credit later in their high school career (after their second year but by the end of their fourth year), and 10% never recovered the Algebra I credit within 4 years.

**Figure 1. Cumulative Percentage of Students Who Passed Algebra I, Among Students Who Did Not Pass in Ninth Grade**



Note. Sample size = 5,720 students. The “end of grade” time period includes courses passed during the summer immediately after that school year. For example, the end of Year 1 time period includes courses passed during the summer between the ninth- and 10th-grade year.

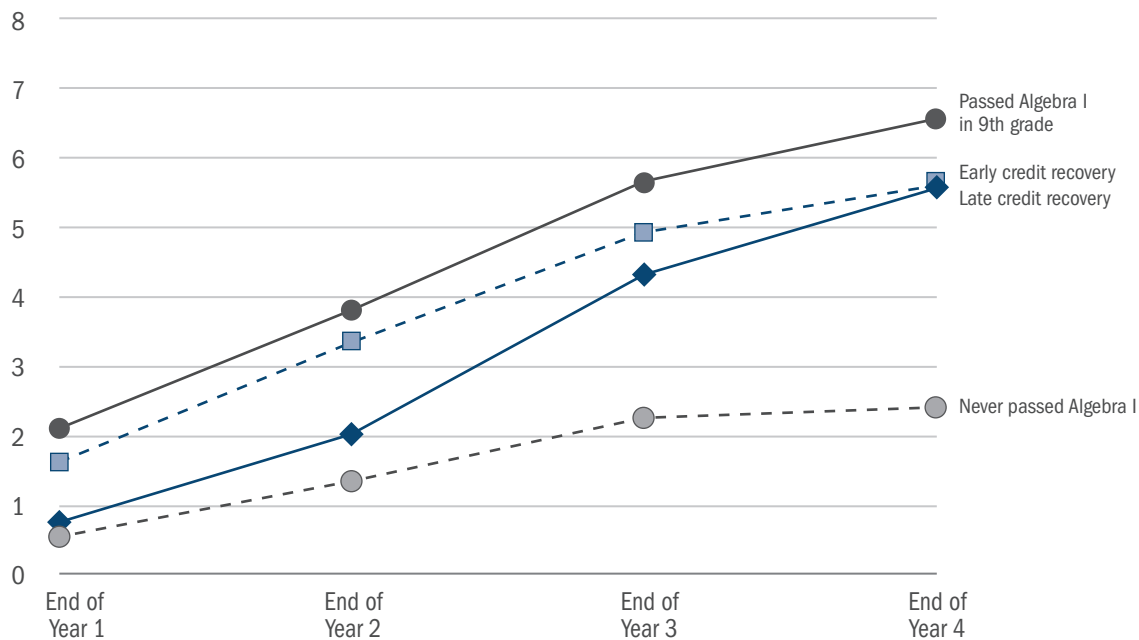
<sup>4</sup> CPS Algebra I completion rates increased during the past decade. In 2001–02, about 69% of first-time ninth graders passed Algebra I. In 2011–12, 78% passed this course.

<sup>5</sup> Our analysis covers the same time period as the *Back on Track* intervention that provided online credit recovery summer classes to expand Algebra I credit recovery in 17 schools. As a result, findings about the percentage of students who passed Algebra I after not passing in ninth grade may be inflated compared to years that did not include the additional online credit recovery classes.

## Almost two-thirds of students who recovered Algebra I credit had enough math course credits to graduate by the end of 12th grade

Students need six math semester credits (3 years of math) to graduate from high school in CPS. Figure 2 displays the average number of math semester credits that students earned over time, by their Algebra I completion status. Students who passed Algebra I in ninth grade accumulated 6.5 math credits, on average, over 4 years, and 87% of them had enough credits to meet the math graduation requirement. Students who did not pass Algebra I in ninth grade but recovered the credit either early or late in high school were about one semester credit behind those who originally passed Algebra I in ninth grade: 5.6 math credits on average. In addition, 65% of early and late credit recovery students had enough credits to meet the math graduation requirement. Students who never passed Algebra I, however, fell well short of the required six math semester courses, and only 9% had enough credits to meet the math graduation requirement.

**Figure 2. Number of Math Semester Credits Accumulated Over Time, by Algebra I Completion Status**

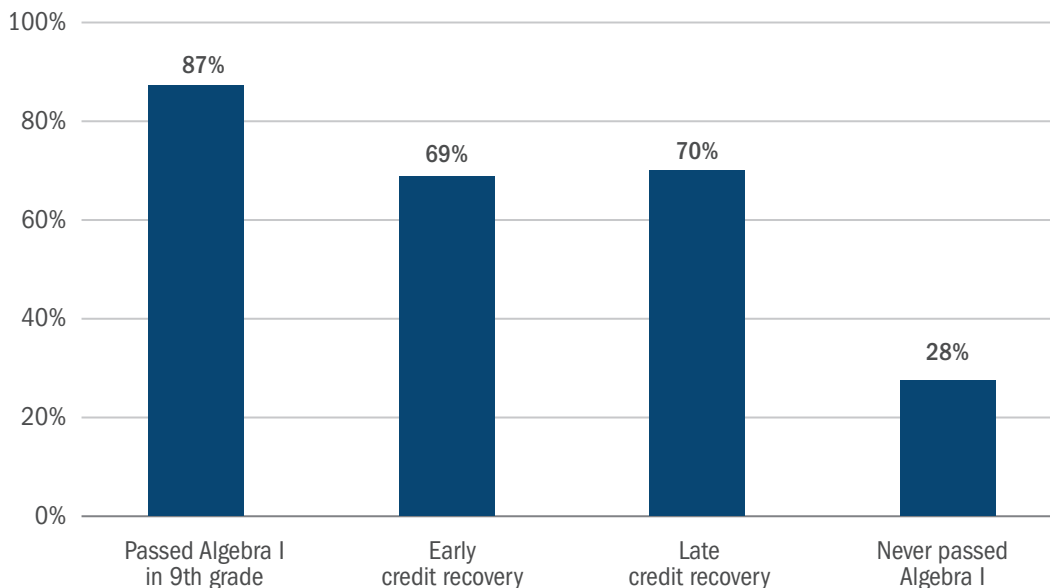


*Note.* Sample size = 25,852 students who passed Algebra I in ninth grade; 1,628 early credit recovery students; 816 late credit recovery students; and 3,276 students who never passed Algebra I. The analysis included students who graduated from high school, dropped out of high school, or were still enrolled in high school after 4 years. The “end of grade” time period includes courses passed during the summer immediately after that school year. For example, the end of Year 1 time period includes courses passed during the summer between the ninth- and 10th-grade year.

Another key indicator of math course progression in high school is whether students pass an Algebra II (including trigonometry) course within 4 years of high school. Algebra II typically represents the third, and final, mathematics course that students take to meet graduation requirements. Figure 3 displays the percentage of students, by their Algebra I completion status, who passed Algebra II (both semesters)

by the end of their fourth year of high school. Most (87%) of the students who passed Algebra I in ninth grade passed Algebra II within 4 years. Slightly more than two-thirds of students who recovered Algebra I credit passed Algebra II within 4 years: 69% of early credit recovery students and 70% of late credit recovery students. Among students who never passed Algebra I, 28% did end up passing Algebra II within 4 years.

**Figure 3. Percentage of Students Who Passed Algebra II by Their Fourth Year of High School, by Algebra I Completion Status**



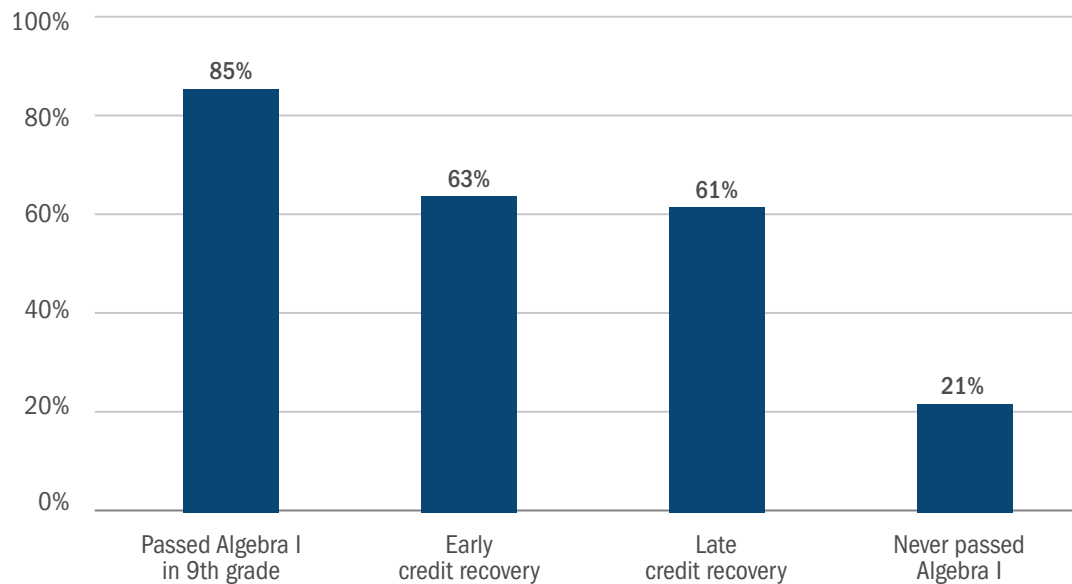
*Note.* Sample size = 25,852 students who passed Algebra I in ninth grade; 1,628 early credit recovery students; 816 late credit recovery students; and 3,276 students who never passed Algebra I. The analysis included students who graduated from high school, dropped out of high school, or were still enrolled in high school after 4 years.

### Almost two-thirds of students who recovered Algebra I credit graduated within 4 years

High school graduation rates mirrored the percentage of students who passed Algebra II by the end of their fourth year. Figure 4 displays the percentage of students who graduated on time, by their Algebra I completion status. Most (85%) of the students who passed Algebra I in ninth grade graduated within 4 years. About two-thirds of students who recovered Algebra I credit graduated within 4 years: 63% of early credit recovery students and 61% of late credit recovery students. Even though students typically have to pass Algebra I to graduate from CPS, and only 9% of students who never passed Algebra I had the required six math semester credits for graduation, the district administrative records indicate that 21% of students who never passed Algebra I graduated on time.<sup>6</sup>

<sup>6</sup> This discrepancy is likely due to two factors: (1) limitations in the course completion records, such as missing courses that students took outside of CPS or not classifying alternative math courses as meeting math requirements; and (2) student-specific accommodations and/or exceptions to the graduation requirements, such as for students with IEPs that specify that Algebra I is not required for graduation.

**Figure 4. Percentage of Students Who Graduated Within 4 Years, by Algebra I Completion Status**



*Note.* Sample size = 25,992 students who passed Algebra I in ninth grade; 1,631 early credit recovery students; 804 late credit recovery students; and 3,253 students who never passed Algebra I.

## Summary

Students who fail Algebra I in ninth grade can get back on track and successfully progress toward graduation. Most students (two-thirds) who failed Algebra I ended up graduating within 4 years if they recovered Algebra I at some point in time. Credit recovery is thus a vital part of getting students to eventually graduate. While math course progression and graduation rates for students who failed but recovered lagged behind those who passed Algebra I in ninth grade, they were notably better than those for students who did not recover Algebra I credit.

The majority of students who failed Algebra I in ninth grade neither recovered the credit nor graduated. These findings highlight the critical need to keep students from failing in the first place. In addition, continuing to find ways to provide flexible options for students to recover credits will continue to be essential for students who fail gateway courses at any point in high school.

Unfortunately, for many students, efforts to improve credit recovery options may not be enough. Most students who failed Algebra I entered ninth grade with preexisting mathematics and reading deficits, and failed multiple classes in ninth grade besides Algebra I (see [Brief 3](#) in this series). Interventions that focus on preventing course failures and improving school engagement may be more critical for the most at-risk students than merely giving them the opportunity to retake a course.



## Endnotes

- i. Ham, S., & Walker, E. (1999). *Getting to the right algebra: The Equity 2000 initiative in Milwaukee Public Schools*. New York, NY: MDRC. Retrieved from <http://eric.ed.gov/?id=ED441896>
- ii. Helfand, D. (2006, January 30). A formula for failure in L.A. schools. *Los Angeles Times*. Retrieved from <http://www.latimes.com/local/la-me-dropout30jan30-story.html>
- iii. Allensworth, E., & Easton, J. Q. (2007). *What matters for staying on-track and graduating in Chicago Public High Schools: A close look at course grades, failures and attendance in the freshman year*. Chicago, IL: Consortium on Chicago School Research.
- iv. Heppen, J. B., Sorensen, N., Allensworth, E., Walters, K., Rickles, J., Taylor, S. S., & Michelman, V. (2017). The struggle to pass algebra: Online vs. face-to-face credit recovery for at-risk urban students. *Journal of Research on Educational Effectiveness*, 10(2), 272–296.



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